



Billing Code 4333–15

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2015–0148; 4500030113]

RIN 1018–BA86

Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Headwater Chub and Roundtail Chub Distinct Population Segment

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule; withdrawal.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), withdraw the proposed rule to list the headwater chub (*Gila nigra*) and a distinct population segment (DPS) of the roundtail chub (*Gila robusta*) from the lower Colorado River basin as threatened species under the Endangered Species Act (Act). This withdrawal is based on a thorough review of the best scientific and commercial data available, which indicate that the headwater chub and the roundtail chub DPS are not discrete taxonomic entities and do not meet the definition of a species under the Act. These fish are now recognized as a part of a single taxonomic species—the roundtail chub (*Gila robusta*). Because the entities previously proposed for listing are no longer recognized as species, as defined by the Act, we have determined that they are not listable entities and we are withdrawing our proposed rule to add them to the List of Endangered and Threatened Wildlife.

Section 4(b)(6) of the Act and implementing regulations at 50 CFR 424.17 provide that the Service must, within 1 year of a proposed rule to list, delist, or reclassify

species, or to designate or revise critical habitat, withdraw the proposal if the available evidence does not justify the proposed action. The document withdrawing the rule must set forth the basis upon which the proposed rule has been found not to be supported by available evidence. Once withdrawn, the action may not be re-proposed unless sufficient new information is available.

FOR FURTHER INFORMATION CONTACT: Steve Spangle, Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Office, 9828 North 31st Ave #C3, Phoenix, AZ 85051-2517; telephone 602-242-0210. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Services at 800-877-8339.

SUPPLEMENTARY INFORMATION

Previous Federal Action

On October 7, 2015 (80 FR 60754), we published a proposed rule to list the headwater chub and the lower Colorado River basin roundtail chub DPS (roundtail chub DPS) as threatened species under the Act (16 U.S.C. 1531 et seq.). On August 15, 2016 (81 FR 54018), we announced a 6-month extension on the final listing determination that the Act allows when there is substantial disagreement regarding the sufficiency or accuracy of the available data, and reopened the comment period on the proposed listings for 30 days. During this comment period we received new information. On November 1, 2016 (81 FR 75801), we reopened the comment period on the proposed listings for an additional 45 days to provide the public additional time to review and consider the proposed rulemakings in light of this new information. As a result of the 6-month

extension, the deadline to finalize, modify, or withdraw the proposed rule is April 7, 2017.

For a description of additional previous Federal actions concerning these species, please refer to the October 7, 2015, proposed listing rule (80 FR 60754).

Background

At the time we published our proposed rule (October 7, 2015; 80 FR 60754), the Committee on Names of Fishes, a joint committee of the American Fisheries Society and American Society of Ichthyologists and Herpetologists (the Societies) (Page *et al.* 2013, p. 71), considered headwater chub and roundtail chub to be separate species. As a consortium of fisheries scientists, the American Fisheries Society is the recognized and accepted scientific authority on fish taxonomy. Accordingly, our proposed rule assessed the headwater chub and roundtail chub as separate species. However, commenters on our proposed rule raised questions during the public comment period regarding the taxonomic distinctness of the headwater and roundtail chubs, as related to the Gila chub (*Gila intermedia*). At that time, some scientists knowledgeable about the fish contended that the three entities were not separate species (Carter *et al.* 2016 in press; Copus *et al.* 2016). For this reason, the Arizona Game and Fish Department requested that the Societies evaluate the most recent literature associated with roundtail chub, headwater chub, and Gila chub taxonomy. In their final report to the Arizona Game and Fish Department, the Societies panel concluded that “no morphological or genetic data define populations of Gila in the lower Colorado River basin (which, as defined by the Service, includes the Little Colorado River, Bill Williams River, Gila River, Verde River, and Salt River drainages) as members of more than one species” and “that the data available

support recognition of only one species of *Gila*, the roundtail chub, *Gila robusta*“ (Page *et al.* 2016, p. 1). These three fish are now considered by the Societies to be a single species, roundtail chub (*Gila robusta*) because data do not support recognition of three species.

Taxonomy

Introduction

The taxonomic history of the genus *Gila* in the Colorado River basin has changed over time, especially for the three forms (roundtail, headwater, and Gila chub) found in the Gila River basin. These forms have been variously classified as full species, assigned as different species, subspecies of *Gila robusta*, or as part of a "*Gila robusta* complex" (Miller 1945; Holden 1968; Rinne 1969; Holden and Stalnaker 1970; Rinne 1976; Smith *et al.* 1977; DeMarais 1986; Rosenfeld and Wilkinson 1989; Dowling and DeMarais 1993; Douglas *et al.* 1998; Minckley and DeMarais 2000; Gerber *et al.* 2001). As noted by nearly all researchers investigating the systematics of *Gila* spp., the taxonomic situation is complicated and problematic (Holden and Stalnaker 1970; Minckley 1973; Minckley and DeMarais 2000; Gerber *et al.* 2001; Schönhuth *et al.* 2014) due to various factors including multiple independent hybridization events over time (Rinne 1976; DeMarais 1986; Rosenfeld and Wilkinson 1989; DeMarais *et al.* 1992; Dowling and DeMarais 1993; Minckley and DeMarais 2000; Gerber *et al.* 2001; Schwemm 2006; Schönhuth *et al.* 2014; Brandenburg *et al.* 2015,) potential past introgression (the transfer of genetic information from one species to another as a result of hybridization between them and repeated backcrossing) (DeMarais *et al.* 1992; Minckley and DeMarais 2000), recent divergence within the three fish (Schwemm 2006). Further, the original

assignment to species was based on the assumption that the three fish do not overlap geographically (parapatry), which we recognize now is not an accurate assumption. Additionally, in some instances when the same fish was identified based on morphology (physical characteristics) it was identified as one species and when identified based on genetic analysis it was identified as a different species (Dowling *et al.* 2015, pp. 14–15). Recent and ongoing genetic and morphologic analyses of chubs in the Gila River basin continue to yield conflicting results (DeMarais *et al.* 1992; Schwemm 2006; Dowling *et al.* 2008 and 2015; Schönhuth *et al.* 2014; Marsh *et al.* 2016, all entire).

History

Gila robusta (roundtail chub) was first described by Baird and Girard (1853, p. 365–369) from specimens collected in 1851 from the Zuni River (tributary to Little Colorado River). *Gila nigra* (headwater chub; formerly known as *G. robusta graham* or *G. grahami*) was first described as a subspecies (*G. robusta graham*) from Ash Creek in the San Carlos River in east-central Arizona in 1874 (Cope and Yarrow 1875, p. 663), but not returned to full species status (*G. robusta*) until proposed so by Minckley and DeMarais (2000, p. entire). The Societies accepted *Gila nigra* as a full species (Nelson *et al.* 2004, p. 71), as did the New Mexico Department of Game, Fish (Carman 2006, p. 3), Arizona Game, and Fish Department (AGFD 2006, p. 3) and continued to recognize *G. robusta* as a distinct species. Therefore, based on the best available commercial and scientific data the Service accepted both *Gila robusta* and *Gila nigra* as full species as documented in our 12-month findings (May 3, 2006; 71 FR 26007 and July 7, 2009; 74 FR 32352). In their 2013 publication of Common and Scientific Names of Fishes from the United States, Canada, and Mexico, the Societies continued to list both *Gila robusta*

and *Gila nigra* as distinct species (Page *et al.* 2013, p. 71). A summary of the historic and current nomenclature from Rinne (1976, entire), Sublette *et al.* (1990, entire), and Minckley and DeMarais (2000, entire) is summarized in Voeltz (2002, pp. 5–8) and Copus *et al.* (2016, pp. 1–6). The Gila chub (*Gila intermedia*) is currently listed as an endangered species (November 2, 2005; 70 FR 66664).

These entities were originally classified based on the streams in which they were found (Minckley and DeMarais 2000, p. 252), under the assumption that *G. robusta* and *G. nigra* either did not overlap (allopatric, no gene flow) or there was only a narrow overlap (parapatric; limited interaction and opportunity for gene flow) (Minckley and DeMarais 2000 pp. 252–254). Because hybridization between *G. robusta* and *G. intermedia* indicates that these fish must co-occur in some streams (Minckley and DeMarais 2000, entire), we conclude that Minckley and DeMarais’s (2000) assumption they did not overlap was unfounded. Further, other studies have found that fish designated as *G. robusta*, *G. nigra*, and *G. intermedia* overlap geographically or occur adjacent to one another (Dowling and Marsh 2009, p. 1; Marsh *et al.* 2016, p. 57; Brandenburg *et al.* 2015, p. 18).

Morphology

The approach for classifying *G. robusta*, *G. nigra*, and *G. intermedia* developed by Minckley and DeMarais (2000, pp. 254–255) presumes there is little intraspecific variation (differences within a species) in the morphologic and meristic (counting quantitative characteristics such as fins) characteristics used to distinguish these three taxa. However, the three purported species overlap in physical characteristics, and many fish have intermediate physical characteristics. Those characteristics that do not overlap

are separated by very small margins, making species-level identification of individual fish problematic, even when the geographic origin of the species is known (Brandenburg 2015, entire). Minckley and DeMarais (2000, pp. 253–254) indicate that *G. nigra* is physically different from *G. intermedia* even though they appear physically more similar to one another than either is to *G. robusta*. In addition, Copus *et al.* (2016, p. 13) did not find physical characteristics in the Minckley and DeMarais (2000, pp. 254–255) classification key to reliably differentiate *G. robusta*, *G. nigra*, and *G. intermedia* from one another. Copus *et al.* (2016 p. 16) concluded that there was no morphological basis for taxonomic distinctions within the *Gila* spp. complex.

Genetics

Multiple genetic analysis studies have been conducted that reveal differences between different chub populations, but have been unable to identify differences between *G. robusta*, *G. nigra*, and *G. intermedia* (DeMarais *et al.* 1992, pp. 2748–2749; Schwemm 2006, p. 29; Dowling *et al.* 2008, p. 2, and 2015, p. 13; Copus *et al.* 2016, pp. 14–15; Marsh *et al.*, 2016, p.58). Mitochondrial DNA analysis (Schönhuth *et al.* 2014, p. 223) indicates that *G. robusta*, *G. nigra*, and *G. intermedia* belong to one clade (a grouping that includes a common ancestor and all its descendants, living and extinct, of that ancestor). Schönhuth *et al.* (2014, p. 223) hypothesized that this could reflect hybridization or incomplete lineage sorting (when the lineage of a specific gene is not the same as the lineage of the species, obscuring the true species relationship).

However, when nuclear DNA (rather than mitochondrial DNA) was analyzed, a broader grouping was identified that included *G. seminude* and *G. elegans*, but when mitochondrial and nuclear DNA results are combined *G. robusta*, *G. nigra*, and *G.*

intermedia were in one grouping (Schönhuth *et al.* 2014, p. 223). Preliminary studies by Chafin *et al.* (2016) indicate evolutionary independent lineages for *G. robusta*, *G. nigra*, and *G. intermedia*, and that the hybrid origin of *G. nigra* is not supported. Studies by Marsh *et al.* (2016, entire) point to genetic variation between populations of *G. robusta* and *G. nigra*, and demonstrate evidence that distinct ecological differences between some populations are now thought to exist. Minckley and DeMarais (2000, entire) supported recognition of three species, but acknowledged that most genetic variation was within populations for *G. robusta*, and was among populations for *G. intermedia* and *G. nigra*. Minckley and DeMarais (2000, p. 253) also indicated that these three fishes share genetic features (that had been studied so far) while behaving as separate non-overlapping (allopatric) morphological species. In addition, some populations assigned to species based on genetics appeared to conflict with the species level-assignment based on morphology (Dowling *et al.* 2008, p. 27).

Speciation

Minckley and DeMarais (2000, p. 253) describe three different taxonomic options for chubs in the Gila River basin: a single species with many different forms or stages (polymorphic species), a species containing multiple subspecies, or three full species. They acknowledge that none of these taxonomic options is biologically justified without knowing if these fish naturally occur in the same geographic area (sympatry, indicating an initial interbreeding population that split), or occur immediately adjacent to each other but not significantly overlapping (parapatry, indicating there is no barrier to gene flow). They further acknowledge that a persistent narrow interaction zone (parapatry, indicating there is no barrier to gene flow) of morphologically distinguishable *G. robusta*, *G.*

intermedia, and *G. nigra* has been confirmed, but note that in no instance was any two of the three caught at the same locality (allopatric, no gene flow; p. 251). However, they also acknowledge that hybridization (between *G. robusta* and *G. intermedia*, resulting in *G. nigra*) in the past must have occurred in some places and not others, thereby demonstrating occurrence in the same geographic area (sympatry) (p. 253). They conversely hypothesized that the current minimal overlap in an area where species are adjacent (parapatry, indicating there is no barrier to gene flow) may thus reflect an ancestral ecological segregation area (sympatry, indicating an initial interbreeding population that split due to the use of different habitats and resources) that promoted persistence in the ever-increasing aridity of the Southwest (p. 253).

In Fossil Creek, *G. nigra* and *G. robusta* appear to be sympatric, including hybrids between *G. robusta* and *G. nigra* (Marsh *et al.* 2016, p. 57). Brandenburg *et al.* (2015, p. 18) concluded that the morphological assessment of *Gila* spp. in New Mexico confirmed that the three fish were found in the same geographic area (sympatric) in almost all cases, contradicting Minckley and DeMarais' results (2000, p. 251) as well as other previous literature suggesting that these *Gila* spp. are occurring in separate non-overlapping geographical areas (allopatric) through their ranges (Rinne 1969, p. entire; DeMarais 1986, p. entire; Minckley and DeMarais 2000, p. 253). In Fossil Creek, they found that *G. nigra* and *G. robusta* are locally in the same geographic area (sympatric) and have hybridized (Marsh *et al.* 2016, p. 57). Marsh *et al.* (2016, p. 58) concluded there are two morphologically similar, but genetically distinguishable, chub in Fossil Creek, *G. robusta* and *G. nigra*.

Conservation Implications

Dowling *et al.* (2015, pp. 14–15) reasoned that the lack of diagnostic molecular characteristics does not inform the status of these three fish, but rather highlights the role that local evolution has played in shaping patterns of variation in these taxa and the importance of accounting for this variation when managing the complex. Most, if not all, scientists agree that conservation actions for these chubs must be directed at the population level and must include consideration of the complex as a whole (Dowling *et al.* 2008, pp. 30–31; Dowling and DeMarais 1993, p. 445; Gerber *et al.* 2001, p. 2037; Schwemm *et al.* 2006, pp. 32–33). The Arizona Game and Fish Department recognizes the importance of conserving the currently recognized roundtail chub population rangewide (including the formerly known headwater chub and Gila chub) and is committed to the conservation agreements and practices that have been in place since 2006 (AGFD 2017, entire; AGFD 2006, entire).

Public Comments

In our October 7, 2015 proposed rule (80 FR 60754), we requested that all interested parties submit comments or information concerning the proposed listings during a 60-day comment period, ending December 7, 2015. We particularly sought comments concerning genetics and taxonomy. In our August 15, 2016, 6-month extension document (81 FR 54018), we reopened the comment period on the proposed rule for 30 days, ending September 14, 2016, and we again requested comments and information regarding genetics and morphology that would aid in resolving the ongoing taxonomic issues regarding classification of these fish. On November 1, 2016 (81 FR 75801), we announced an additional 45-day comment period, ending December 16, 2016, on the October 7, 2015 proposed rule.

We provided notification of these publications and their comment periods through e-mail, letters, and news releases faxed and/or mailed to the appropriate Federal, State, and local agencies; county governments; elected officials; media outlets; local jurisdictions; scientific organizations; interested groups; and other interested parties.

In accordance with our peer review policy published in the **Federal Register** on July 1, 1994 (59 FR 34270), we solicited independent opinions from at least three knowledgeable individuals who have expertise with these fish, who possess a current knowledge of the geographic region where the fish occurs, and/or are familiar with the principles of conservation biology.

We reviewed all comments received from peer reviewers and the public for substantive issues and new information regarding the proposed listing of *G. nigra* and the *G. robusta* DPS. Substantive comments pertaining to the taxonomy of these fish received during the comment period are addressed below. We also received several comments from both the public and peer reviewers concerning threats to these fish; however, because our withdrawal is due to taxonomic revision such comments are outside the scope of this withdrawal.

Peer Review Comments

(1) *Comment:* One peer reviewed stated that there are no recent (since 2000) publications in the peer-reviewed literature that provide evidence that *Gila intermedia*, *G. nigra*, and *G. robusta* are other than separate and distinct species. The peer reviewer further stated that there are articles that study the genetics or morphology of these fish without questioning its taxonomy, specifically Schönhuth *et al.* 2014, Schönhuth *et al.* 2012, and Marsh *et al.* in press.

Response: Multiple studies since 2000 provide information on the genetic analysis for these fish, including Schwemm 2006, Dowling *et al.* 2008 and 2015, and Copus *et al.* 2016. While these studies may not have questioned the taxonomic classification, they also have not been able to identify genetic markers that have the ability to distinguish among *G. robusta*, *G. nigra*, and *G. intermedia*. Schönhuth *et al.* (2008, p. 213; 2014, p. 223), using mitochondrial and nuclear DNA sequencing, found that *G. robusta*, *G. nigra*, and *G. intermedia* were well supported as having a common ancestor. Using mitochondrial DNA, Schönhuth *et al.* (2008, p. 213; 2014, p. 223) found that *G. robusta*, *G. nigra*, and *G. intermedia* were in one grouping that included a common ancestor and all the descendants (living and extinct) of that ancestor (clade), and this could reflect incomplete lineage sorting or hybridization. However, when nuclear DNA was analyzed, a broader grouping was identified that included *G. seminuda* and *G. elegans*, but when mitochondrial and nuclear DNA results were combined, *G. robusta*, *G. nigra*, and *G. intermedia* were alone in one grouping. While Marsh *et al.* (2016, entire) concluded there are two similar but genetically distinguishable species in the creek they studied, their findings differ somewhat from Schwemm (2006) and Dowling *et al.* (2008 and 2015, entire), who were unable to conclusively identify distinct species using genetic markers across a much wider range. Further, the Societies conducted a review of the literature and found no evidence to support three species. The Service has reviewed the best available scientific and commercial data and also found a lack of sufficient evidence to support more than one species.

(2) *Comment:* Recognized authorities on the taxonomy and ecology of these fish recognized these fish as separate species based on morphological diagnostics.

Response: Minckley and DeMarais (2000), Miller *et al.* (2005), and Minckley and Marsh (2009) report identification of three species using a diagnostic morphological key. However, additional reports were unable to reliably identify these three fish to species using the same diagnostic key (Carter *et al.* 2016, p. 2 and 20, in press; Brandenburg 2015, entire; Copus *et al.* 2016, p. 13). Further, Minckley and DeMarais (2000, pp. 253–254) stated that *G. nigra* is morphologically separate from *G. intermedia*, but that *G. nigra* and *G. intermedia* appear morphologically more similar to one another than either is to *G. robusta*. In addition to issues surrounding morphological identification, multiple genetic analysis studies have found population-level differences, but have been unable to identify genetic markers that have the ability to distinguish among *G. robusta*, *G. nigra*, and *G. intermedia* (DeMarais 1992, pp. 2748–2749; Schwemm 2006, p. 29; Dowling *et al.* 2008, p. 2, and 2015, p. 13; Copus *et al.* 2016, pp. 14–15). There are also the findings of Schönhuth *et al.* (2014), Schönhuth *et al.* (2012) as described in Response to Comment 1.

(3) *Comment:* Conclusions are mainly based on two “gray literature” reports that have not undergone peer review (Copus *et al.* 2016) or were not available for public consideration (Carter *et al.* 2016, in press).

Response: Section 4(b)(1)(A) of the Act requires the Service to make listing or delisting decisions based on the best scientific and commercial data available. Further, our Policy on Information Standards under the Act (July 1, 1994; 59 FR 34271), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines (<https://www.fws.gov/informationquality>),

provide criteria and, guidance, and establish procedures to ensure that our decisions are based on the best scientific data available. They require us, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for our determinations. Primary or original information sources are those that are closest to the subject being studied, as opposed to those that cite, comment on, or build upon primary sources. The Act and our regulations do not require us to use only peer-reviewed literature, but instead they require us to use the “best scientific and commercial data available.” We use information from many different sources, including articles in peer-reviewed journals, scientific status surveys and studies completed by qualified individuals, Master's thesis research that has been reviewed but not published in a journal, other unpublished governmental and nongovernmental reports, reports prepared by industry, personal communication about management or other relevant topics, conservation plans developed by States and counties, biological assessments, other unpublished materials, experts' opinions or personal knowledge, and other sources. For these reasons, we think it is appropriate to include review of Copus *et al.* (2016) and Carter *et al.* (2016, in press), as well as other sources, within our review.

(4) *Comment:* Several authors presented data and conclusions that conflicted with the previously cited Carter *et al.* (2016, in press) and Copus *et al.* (2016) reports pertaining to morphological identification, DNA analysis, and ecological equivalency to a subset of the Joint Committee convened in April 2016, to specifically address the taxonomy of the roundtail chub complex.

Response: We were present at the April 2016 Joint Committee webinar, and experts beyond Carter and Copus, such as Brandenburg, Schwemm, Dowling, O'Neill, and Chafin, also provided information based on research they either had previously conducted or are currently conducting on *Gila*. A complete list of references cited may be obtained on the Internet at <http://www.regulations.gov> and upon request from the Arizona Ecological Services Office (see **FOR FURTHER INFORMATION CONTACT**). The Service has reviewed the best available scientific and commercial data and found a lack of sufficient evidence to support more than one species.

(5) *Comment:* This taxonomic dispute is not simply an academic exercise of whether to lump or split taxa, because the decision has enormous implications for the conservation of imperiled species. Multiple experts recommended that the roundtail chub complex, however it is constituted, be managed as separate populations or managed as a complex.

Response: The Service recognizes that multiple experts agree that conservation actions must be directed at the population level and must include consideration of the complex as a whole (Dowling *et al.* 2008, pp. 30–31; Dowling and DeMarais 1993, p. 445; Gerber *et al.* 2001, p. 2037; Schwemm 2006, pp. 32–33). However, the Service must adhere to the Act and its implementing regulations, which define a “species” as any species or subspecies of fish, wildlife, or plant, and any distinct population segment of any vertebrate species which interbreeds when mature (16 U.S.C. 1532(16) and 50 CFR 424.02). The best available scientific and commercial data as discussed above in the *Taxonomy* section, support recognition of only one species, *Gila robusta*. The Service’s withdrawal of our proposed rule to list the headwater and roundtail chub based on new

taxonomic classification does not diminish the conservation efforts of our partners to conserve this species and habitat, nor does our decision affect the State's ability to conserve this species under its own authority. The Arizona Game and Fish Department recognizes the importance of conserving the currently recognized roundtail chub population rangewide (including the formerly known headwater chub and Gila chub) and is committed to the conservation agreements and practices that have been in place since 2006 (AGFD 2017, entire; AGFD 2006, entire).

(6) *Comment:* Multiple commenters raised concerns with Copus *et al.* (2016) methods and conclusions, particularly small sample size, lack of key analytical and laboratory steps, the study's DNA sequence data filtering and analyses that failed to follow best practices for phylogenetic analysis, and specimen shrinkage associated with duration of preservation impacting morphological diagnostics.

Response: The Service did not rely solely on Copus *et al.* 2016. We considered the best available commercial and scientific data; you may obtain a complete list of references cited on the Internet at <http://www.regulations.gov> and upon request from the Arizona Ecological Services Office (see **FOR FURTHER INFORMATION CONTACT**). In regards to the mitochondrial DNA and phylogenetic analysis, Copus *et al.*'s findings are consistent with Schönhuth *et al.*'s (2014) and Schönhuth *et al.*'s (2012) mitochondrial DNA and phylogenetic analysis. In addition, multiple genetic analysis studies have been conducted that indicate population-level differences, but do not identify genetic markers that have the ability to distinguish among *G. robusta*, *G. nigra*, and *G. intermedia* (DeMarais 1992, pp. 2748–2749; Schwemm 2006, p. 29; Dowling *et al.* 2008, p. 2, and 2015, p. 13).

In regards to morphological diagnostic errors due to using preserved specimens, Copus *et al.* (2016) did use preserved specimens. However, they also analyzed fresh material and concluded that no single diagnostic character can be used for species identification, and with considerable overlap among species in every morphological character, no suite of characters can distinguish species unambiguously (Copus *et al.* 2016, p. 13). Brandenburg *et al.* (2015, entire) also reported overlap in the meristic and morphometric characteristics, records of many individual fish with intermediate physical characteristics, and even those characters that do not overlap are separated by very small margins making species-level identification of individual fish problematic, even when the geographic origin of the species is known.

Public Comments

(7) *Comment:* Multiple commenters requested various listing alternatives under the Act including: List *G. robusta* as threatened and encompass all populations of the chub complex within the Gila basin requiring a revision of the recovery plan, list *G. robusta* and *G. nigra* as threatened and retain the current endangered species status of *G. intermedia*, list *G. robusta* as threatened and retain the current endangered species status of *G. intermedia*, or other combinations.

Response: The Service must adhere to the Act and its implementing regulations, which define a “species” as any species or subspecies of fish, wildlife, or plant, and any distinct population segment of any vertebrate species which interbreeds when mature (16 U.S.C. 1532(16) and 50 CFR 424.02), and based on our review, the best available scientific and commercial data support recognition of only one species, *Gila robusta*. As

the headwater chub and roundtail chub DPS no longer meet the definition of a “species” under the Act, we must withdraw our proposed rule to list them as threatened species.

(8) *Comment:* Multiple commenters stated that there is a great amount of morphological overlap among counts and measures for these chub taxa and that this has long been recognized. If a taxonomic key is not 100 percent correct, that does not necessarily mean that these are not taxa that are biologically distinct at the specific level. A test of the key would require the *a priori* identification of each individual to species. Rather than dismiss the species’ taxonomic status, biologists should be working to make a better key that can be used in the field for the effective identification and management of the species.

Response: We recognize that diagnostic keys do not produce correct results all the time, whether due to human error or morphological similarities among purported species. However, Copus *et al.* (2016, p. 13) concluded that, based on genetic analysis, no single diagnostic character can be used for species identification, and with considerable overlap among species in every morphological character, no suite of characters can distinguish species unambiguously. Brandenburg *et al.* (2015, entire) also reported overlap in the meristic and morphometric characteristics, and there are many individual fish whose morphology resides on an intermediate spectrum, and even those characters that do not overlap are separated by very small margins, making species-level identification of individual fish problematic, even if the geographic origin of the species is known. In regards to *a priori* identification of fish, assignment to species has been based on the stream in which the fish occurs (Minckley and DeMarais 2000, p. 252), so the identification of the fish that occurs in each stream is assumed to be known.

Consequently, there exists the ability to compare findings from the diagnostic key to the fish within a particular stream. An updated key may be prudent; however, the Service must use the best available scientific and commercial data available, and we have concluded from our review that the data currently support only one species, *Gila robusta*. Further, given the overlap in diagnostic characteristics, the development of a valid key seems unlikely.

(9) *Comment:* Multiple commenters stated that it has long been hypothesized that *G. nigra* formed as the result of hybridization between the other two taxa, so we would expect the greatest morphological overlap from that species with the other two taxa. The question then becomes, is *G. nigra* continuing to differentiate from ancestral *G. robusta*? When in sympatry, *G. nigra* and *G. robusta* are becoming increasingly reproductively isolated from one another (Desert Fishes Council meeting, Dowling *et al.* 2016).

Response: We recognize that multiple studies have indicated that hybridization has occurred among *G. intermedia* and *G. robusta* resulting in *G. nigra* and that continuing evolution may occur (Schwemm 2006; Dowling *et al.* 2008, entire). However, there has also been information presented showing no evidence of the hybrid origin of *G. nigra*, and that *G. intermedia* and *G. nigra* evolved separately in non-overlapping areas (parapatry) (Chafin 2016, entire). In addition, past research (Dowling *et al.* 2008, 2015; Schwemm 2006) indicate that there is more variation among populations and unique genetics within specific populations (streams).

(10) *Comment:* If only *G. robusta* and *G. intermedia* are evaluated, there is no question that they would be considered distinct morphological species.

Response: Carter *et al.* (2016, in press) found that the physical characteristics did not reliably differentiate among *G. robusta*, *G. intermedia*, and *G. nigra*. In addition, Brandenburg *et al.* (2015, pp. 8-9) found physical similarity of the three species, as numerous individuals exhibited intermediate characters along the species gradient. The discriminant function analysis (a statistical analysis tool to determine which variables discriminate between two or more naturally occurring groups) classified only 16 percent (n = 42) of *G. intermedia* (the fewest) while the majority of the samples were classified as *G. robusta* (53.2 percent, n = 140), which indicates that the ability to classify these fish correctly to *G. intermedia* or *G. robusta* based on physical characteristics was low. Due to the complex genetic makeup and observable characteristics or traits (i.e., physical appearance, behavior, or physiology) of these species, there are some stream locations where we do not know where the geographic overlap of headwater, roundtail, and, in some cases Gila chub, begins and ends, because of the plasticity of observable characteristics or traits of these fish within individual streams. Our review of the data does indicate that there are differences in observable characteristics or traits between the fish in different streams, but the Societies' review, as well as the Service review, of the best available scientific and commercial data did not result in a species-level differentiation between *G. robusta* and *G. intermedia*, or among *G. robusta*, *G. intermedia*, and *G. nigra*.

(11) *Comment:* One commenter recommend that we proceed with an amended recovery plan to list the status of this species as threatened under the Act. The listing of this species is necessary even if all populations of *G. intermedia* and *G. nigra* are subsumed into *G. robusta*.

Response: An assessment of the entire range of the new taxonomic group of roundtail chub is planned. We are initiating a status review of the new taxonomic entity in 2 to 4 years. Following that review, we will take action as appropriate.

Determinations

An entity may only be listed under the Act if that entity meets the Act's definition of a species. The recent report by the Societies indicates that neither the headwater chub nor the roundtail chub can be considered species, as defined by the Act. Under section 3 of the Act (16 U.S.C. 1532(16)) and associated implementing regulations at 50 CFR 424.02, a "species" is defined to include any species or subspecies of fish, wildlife, or plant, and any distinct population segment of any vertebrate species which interbreeds when mature. The Act's implementing regulations at 50 CFR 424.11(a) and the Service Director's November 25, 1992, "Taxonomy and the Endangered Species Act" Memorandum (Memo) provide additional guidance on how to consider taxonomic information when assessing a species for listing under the Act. The regulations at 50 CFR 424.11(a) state, "In determining whether a particular taxon or population is a species for the purposes of the Act, the Secretary [of the Interior] shall rely on standard taxonomic distinction and the biological expertise of the Department [of the Interior] and the scientific community concerning the relevant taxonomic group." The Director's Memo specifies that the Service is "required to exercise a degree of scientific judgment regarding the acceptance of taxonomic interpretations, particularly when more than one possible interpretation is available. The Memo further states, "When informed taxonomic opinion is not unanimous, we evaluate available published and unpublished

information and come to our own adequately documented conclusion regarding the validity of taxa.”

The Act requires that we finalize, modify, or withdraw the proposed rule within 12 months. The Act provides for one 6-month extension for scientific uncertainty, which we have used. As such, we are required to make a decision regarding the entities’ eligibility for listing at this time. In addition, section 4(b)(1)(A) of the Act requires the Service to make listing or delisting decisions based on the best scientific and commercial data available. Further, our Policy on Information Standards under the Act (July 1, 1994; 59 FR 34271), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines (<https://www.fws.gov/informationquality>), provide criteria, guidance, and establish procedures to ensure that our decisions are based on the best scientific data available. They require us, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations. Primary or original information sources are those that are closest to the subject being studied, as opposed to those that cite, comment on, or build upon primary sources. The Act and our regulations do not require us to use only peer-reviewed literature, but instead they require us to use the “best scientific and commercial data available.” We use information from many different sources, including articles in peer-reviewed journals, scientific status surveys and studies completed by qualified individuals, Master’s thesis research that has been reviewed but not published in a journal, other unpublished governmental and nongovernmental reports, reports prepared

by industry, personal communication about management or other relevant topics, conservation plans developed by States and counties, biological assessments, other unpublished materials, experts' opinions or personal knowledge, and other sources.

We conducted a similar internal review of the information presented by and available to the Societies in their review. Our review primarily focused on Marsh *et al.* (2016), Carter *et al.* (2016, in press), Copus *et al.* (2016), Minckley and DeMarais (2000), and Chafin *et al.* (2015), as well as other literature as discussed above in the *Taxonomy* section. In their most recent publication of Common and Scientific Names of Fishes (Page *et al.* 2013, p. 8), the Societies state the following regarding the common process of their naming committee: "In accepting species as valid from various works, we made little or no judgment on authors' species concepts. Taxa of uncertain status were dealt with on a case-by-case basis." Based on the Societies' expertise and their internal guidance (stated above) on making such decisions, we conclude that the preponderance of evidence before them was clear and decisive enough to make a taxonomic change.

After reviewing the best available scientific and commercial information (as described above in the *Taxonomy* section and summarized below) and applying statutory and regulatory guidance, we determined that the Societies' report considered the best commercial and scientific data available. We agree with the conclusion that available data support recognition of only one species, *Gila robusta*. Our determination is based on various factors, including the method of original assignment to species, hybridization events, conflicting identification of species based on morphology versus genetics, evolutionary history, morphological identification limitations, and lack of genetic markers to identify species. We lack confidence in the initial species assignments to *G.*

robusta, *G. nigra*, and *G. intermedia* due to the scientific methods used (fish were assigned to a species based on the stream in which they occurred, the erroneous assumption that these fish did not overlap geographically, and the absence of genetic or morphological diagnostic information). Minckley and DeMarais (2000, entire) based their diagnostic key on the assumption that none of these species occurs in the same locality; however, they acknowledge hybridization among *G. robusta* and *G. intermedia*. Further, other studies have found that fish designated as *G. robusta*, *G. nigra*, and *G. intermedia* overlap geographically or occur adjacent to one another (Dowling and Marsh 2009, p. 1; Marsh *et al.* 2016, p. 57; Brandenburg *et al.* 2015, p. 18). In addition, some populations appeared to conflict genetically with the species-level assignment based on morphology (Dowling *et al.* 2015, pp. 14–15). Multiple scientists (as described above) found Minckley and DeMarais’s (2000, entire) key for identification of *G. robusta*, *G. nigra*, and *G. intermedia* to not reliably differentiate among these three fish. In Fossil Creek, Marsh *et al.* (2016, entire) concluded there are two morphologically similar, but genetically distinguishable chub. However, there are several genetic analysis studies indicating population-level differences among these fish, but the studies were not able to identify genetic markers distinguishing between the three fish. Finally, Schönhuth *et al.* (2014, p. 223) found that *G. robusta*, *G. nigra*, and *G. intermedia* were in one grouping that included a common ancestor and all the descendants (living and extinct) of that ancestor (clade), and hypothesized this could reflect incomplete lineage sorting or hybridization, but this was not studied.

For the purposes of our determination, we accept the “single species” finding by the Societies described above and, consequently, withdraw the proposed rule to list the

headwater chub (*Gila nigra*) and a DPS of the roundtail chub (*Gila robusta*) from the lower Colorado River basin as threatened species under the Act. This withdrawal is based on a thorough review of the best scientific and commercial data available, which indicate that the headwater chub and the DPS of the roundtail chub are not discrete taxonomic entities and do not meet the definition of species under the Act. These fish are now recognized as a single taxonomic species—the roundtail chub (*Gila robusta*). Because the entities previously proposed for listing are no longer recognized as species, as defined by the Act, we have determined that they are not listable entities, and we are withdrawing our proposed rule to list.

Future Actions

Following the publication of this withdrawal, we intend to reevaluate the status of the Gila chub (currently listed as endangered) in the near future and initiate a range-wide species status assessment (SSA) of the newly-recognized roundtail chub (*Gila robusta*).

References Cited

A complete list of references cited in this document is available on the Internet at <http://www.regulations.gov> and upon request from the Arizona Ecological Services Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this document are the staff members of the Arizona Ecological Services Office.

Authority

The authority for this action is section 4(b)(6)(B)(ii) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)

Dated: March 21, 2017

Signed: James W. Kurth

Acting Director, U.S. Fish and Wildlife Service.

[FR Doc. 2017-06995 Filed: 4/6/2017 8:45 am; Publication Date: 4/7/2017]